MACHINE ENABLES BLIND TO
READ BY SOUND

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MACHINE ENABLES BLIND TO READ BY SOUND

BY the invention of an electrical "eye" through the medium of which sound waves may be developed from printed letters, a means has apparently been discovered for enabling the blind to read. A professor at the University of Iowa has built an apparatus which literally reads print. It is called a phonopticon, and in the course of experiments has shown itself capable of pronouncing various letters of the alphabet, as well as figures and other characters, by sounding different combinations of musical notes. By learning the particular sounds representative of each letter, a person unable to see is made able to read. It is even considered likely that the apparatus may ultimately be developed so that an impression of a painting or photograph may be conveyed to those deprived of sight.

The "eye," when in use, is moved along a line of text to be read. It is by means of this that other mechanism, which develops and carries the sound waves to the ears of the user, is actuated. Crystalline selenium, a peculiar element that is sensitive to light and a conductor of electricity, is the all-important part of the artificial optic. It is the effect which light has upon this substance that renders it valuable for this purpose. The conductivity of the crystal varies according to the intensity of its illumination, since the resistance of the material is reduced by exposure to luminous rays.

Three separated crystals are placed above an aperture in the reading device and so connected as to form arms of a Wheatstone bridge, which in brief is a device for measuring electrical resistance. When the "eye" is passed over blank paper the instrument is neutral. A bright band of light from an outside source moves with the "eye," illuminating each letter in turn. As the black outline of part of a character is reached its image is thrown through a lens upon one of the crystals. This shadow reduces the illuminated area of the crystal, increasing its resistance. In turn this unbalances the current and deflects a part of it into one of a series of three branch circuits. In each of these is an interrupter which produces a current of definite frequency. These impulses are converted into sound waves of a specific pitch by a resonator provided in each receiver.

In this way, it may be seen, each part of a printed letter, as the upper, lower, and middle sections, acts upon a certain crystal and through it upon a separate interrupter and resonator. The frequency given the currents by the interrupters is governed by the number of segments of the latter and their respective speeds in revolving. The entrance of the successive parts of a letter into the illuminated area is instantly announced by a change in the pitch of the note.

In this particular instrument three telephone receivers are used. The number corresponds to the number of crystals employed, which it is possible to vary from one to four. In order to enable the use of more than two receivers, a pair is incorporated in one holder. These instruments replace the galvanometer of the Wheatstone bridge.

At its present state of development the apparatus weighs approximately 35 lb. and the electrical "eye" 2 lb. These weights are greater than will be required in a finished machine. The

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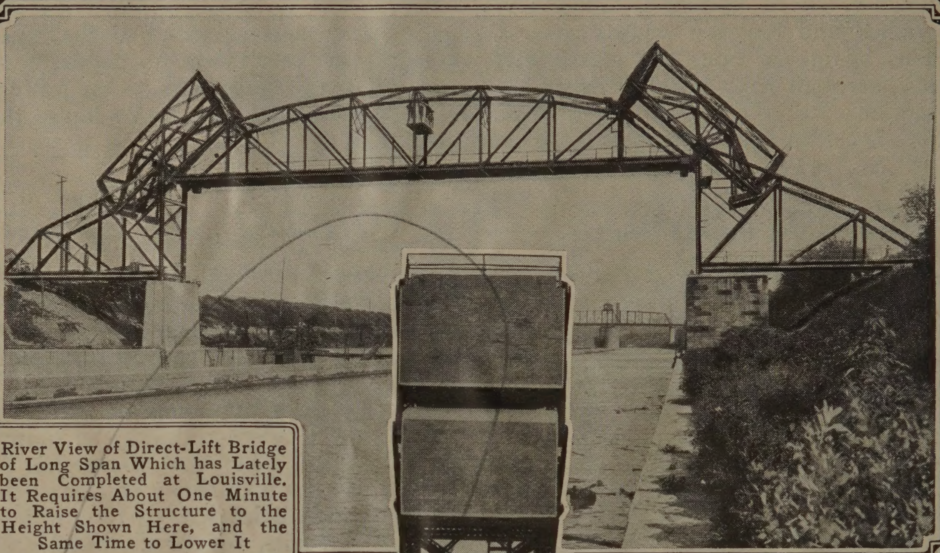
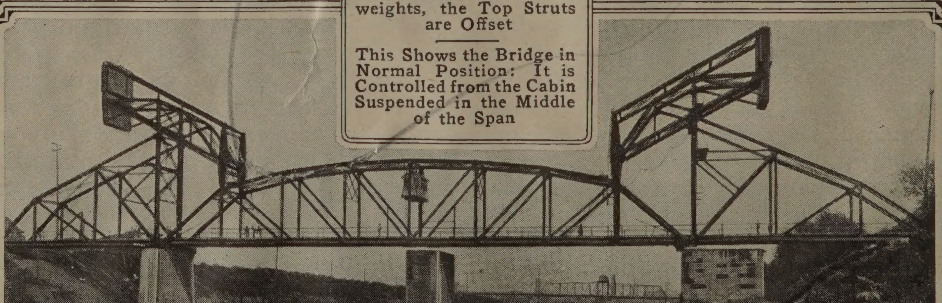
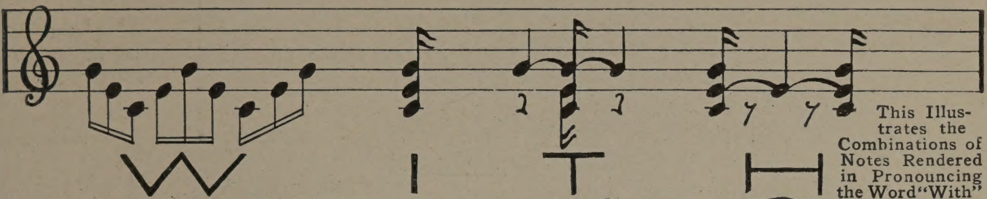


River View of Direct-Lift Bridge of Long Span Which has Lately been Completed at Louisville. It Requires About One Minute to Raise the Structure to the Height Shown Here, and the Same Time to Lower It

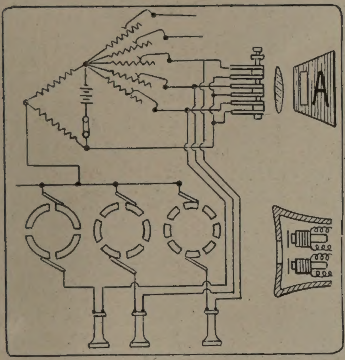
It will be Noticed That in Order to Provide Clearance for the Counterweights, the Top Struts are Offset

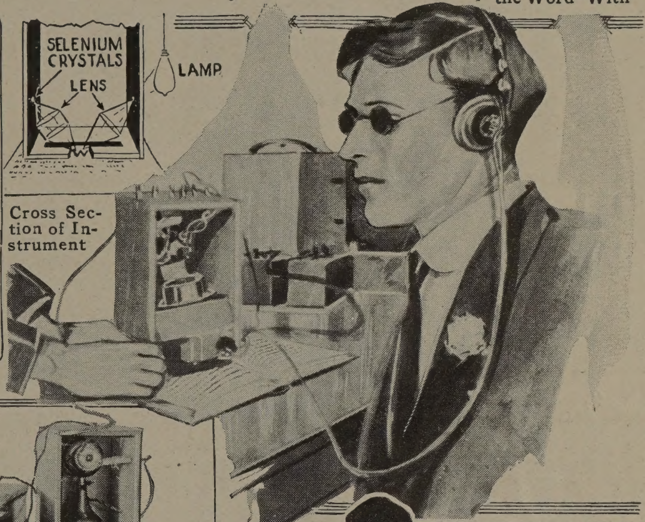


This Shows the Bridge in Normal Position: It is Controlled from the Cabin Suspended in the Middle of the Span

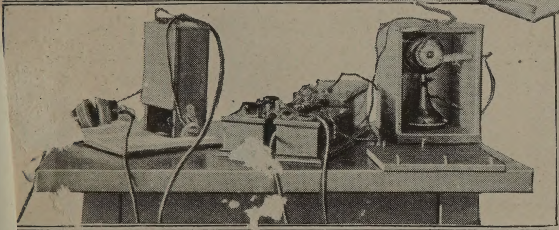


This Illustrates the Combinations of Notes Rendered in Pronouncing the Word "With"

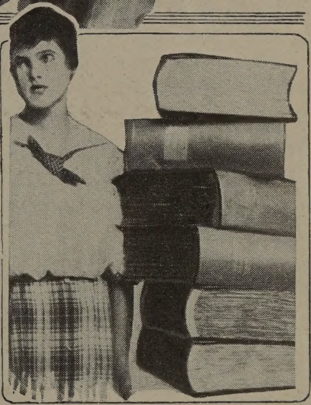




Electric Eye being Passed over a Printed Page



The Diagram Illustrates the Plan of the Phonopticon and the Relative Positions of Crystals, Lens, and Light Band as the Latter is Approaching "A." The Arrangement of Circuits is Also Shown. The Drawing at the Right Explains the Grouping of Receivers in Pairs. Photograph Exhibits Experimental Apparatus Which will Ultimately be Made Lighter and More Compact

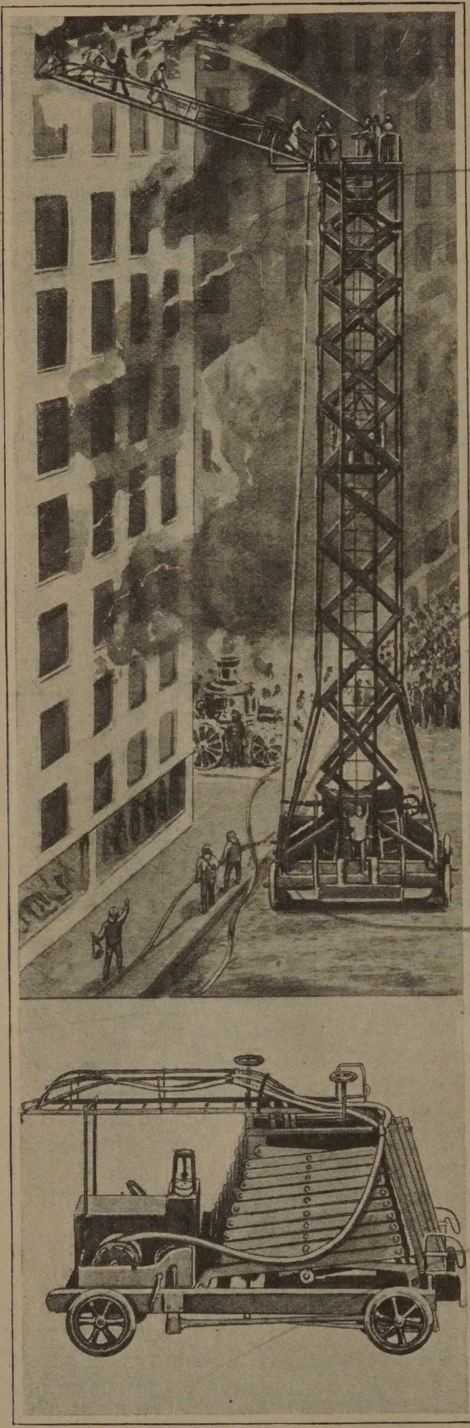


Objections to the Present System of Touch Reading are Made Obvious by This Photograph, Which Shows Six Large Volumes of Raised-Letter Books, the Blind Man's Edition of David Copperfield

"eye" itself, which for convenience needs to be lightened considerably, can be made very compact and not more than a small fraction of a pound in weight.

The apparatus was recently tried out at a California institution for the blind and also at a convention of those engaged in promoting the welfare of blind persons. After a number of subjects had acquainted themselves with the different combinations of sounds peculiar to individual letters, they were able to distinguish letters and words more or less readily. Some of these tones are given in sequence, the letter "V," for instance, being rendered something like G, E, C, E, G, in the key of C major. The notes of characters having upright lines such as "L," "I," and "E," are rendered simultaneously, since the upper, middle, and lower portions act upon the selenium members at the same time.

It is the purpose of the inventor to perfect the machine so that it will be practical for use in any home where it may be needed. It is considered that it will be of value to persons with weak eyes whose businesses necessitate voluminous reading, and that it may also enable many blind persons to become self-supporting.



The Tower may be Elevated to a Height of 100 Feet in One Minute's Time. Its Appearance When Collapsed is Shown Below

NOVEL COLLAPSIBLE TOWER FOR FIRE FIGHTERS

For life-saving and fire-fighting purposes, a Salem, Mass., inventor has designed a collapsible tower which may be extended to a height of 100 ft. in approximately one minute. Its plan of construction is not greatly unlike that of some of the folding observation structures employed in the field by European armies. At the top it supports a working platform for the fire fighters, on one end of which is fixed a short extension ladder which may be adjusted to various angles. In addition to this there is a jointed steel ladder reaching from the ground to the apex of the structure, which is raised into position with the rest of the apparatus. Fixed in the middle of the shaft is a basket elevator that is intended to be used for lowering persons rescued from burning buildings. Two leads of fire hose secured to the "fighting top" are carried up with the tower as it is raised. The device is intended to be mounted on a motor truck and operated by the machine's power plant. When collapsed it fills the space back of the driver's seat.

POWERFUL LIGHT PRODUCED WITH NITROGEN LAMP

Through the development of a specially designed reflector and projector-type housing for an incandescent lamp, a young western electrician has brought out a lantern which when fitted with a 1,000-watt nitrogen-filled globe produces a penetrating light rated at approximately 500,000 candlepower.

The lamp is suited for various indoor purposes and is also well adapted for brilliant exterior illumination. Simplicity, efficiency, and economy in operation make its use more convenient in many places than the more expensive and complex searchlight. It is because of these attributes that it is of especial value for night construction work in the open as well as for emergency and general purposes.

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Machine enables blind to read by sound.

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